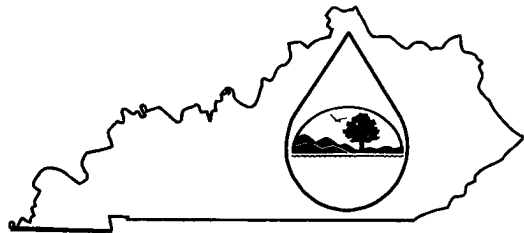


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KPDES FORM HQAA



Kentucky Pollutant Discharge Elimination System (KPDES)

High Quality Water Alternative Analysis

The Antidegradation Implementation Procedures outlined in 401 KAR 5:030, Section 1(3)(b)5 allows an applicant who does not accept the effluent limitations required by subparagraphs 2 and 3 of 5:030, Section 1(2)(b) to demonstrate to the satisfaction of the Environmental and Public Protection Cabinet that no technologically or economically feasible alternatives exist and that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the water is located. The approval of a POTW's regional facility plan pursuant to 401 KAR 5:006 shall demonstrate compliance with the alternatives analysis and socioeconomic demonstration for a regional facility. This demonstration shall also include this completed form and copies of any engineering reports, economic feasibility studies, or other supporting documentation

I. Permit Information KY6046400

Facility Name:	Hopkins Coal Co.	KPDES NO.:	/ 861-0445
Address:	P.O. Box 889	County:	Knox
City, State, Zip Code:	Gray, Ky 40734	Receiving Water Name:	Punch Hollow

II. Alternatives Analysis - For each alternative below, discuss what options were considered and state why these options were not considered feasible.

1. Discharge to other treatment facilities. Indicate which treatment works have been considered and provide the reasons why discharge to these works is not feasible.

The closest water treatment facility to 861-0445, also known as Punch Hollow job in Knox County (Lat: 36° 52' 45" / Lon: 84° 00' 17") is the Barbourville wastewater treatment facility in Knox County (Lat: 36° 51' 56" / Lon: 83° 53' 16"). Thus, the wastewater treatment facility is approximately 6.6 miles from the job site.¹ To effectively transport the discharge to this facility it would require multiple lift and pump stations, (which are approximately \$200,000.00 each, and it cost approximately \$393,792 per year, per pump to maintain them)² With piping costs, estimated at \$22/foot, alone would cost over \$1M. (6.6 miles X 5280 ft/mile=34,565 34,565 X \$22/foot=\$760,430). Another option for water removal would be the use of disposal trucks. However, the cost of purchasing the trucks, maintaining them, and hiring drivers would be a big investment.

2. Use of other discharge locations. Indicate what other discharge locations have been evaluated and the reasons why these locations are not feasible.

There is one tributary (Punch Hollow) around the jobsite. However, this tributary is already being used for this specific project as discharge locations. There is one other tributary in the area, an unnamed tributary to Indian Creek nearby. It would be possible to run water across a mountain to this creek, but as stated above, when you run pipe uphill, you have to install lift stations, (which are approximately \$200,000.00 each, and it cost approximately \$ 393,792 per year, per pump to maintain them).² The main reason why the company is discharging into Punch Hollow is because with piping cost, estimated at \$22/foot, piping alone would cost over \$76 thousand. (.66 miles X 5280 ft/mile=3484. 3484 X \$22/foot = \$76,665.60.)

III. Alternatives Analysis - continued

3. Water reuse or recycle. Provide information about opportunities for water reuse or recycle at this

facility. If water reuse or recycle is not a feasible alternative at this facility, please indicate the reasons why.

The water from this job could be used for maintaining dust and for watering of the postmining land, but after evaluating the option, it was found to not be useful because the slope of the land is greater than 6%. With the slope of the land being greater than 6%, the water couldn't be absorbed quickly enough. The effects of this problem would greatly impact the land, and cause economic stress, by possibly causing slides, and erosion of soil. (Please note that some of the water will be used for dust containment.)

The water volume on hand at this job is 2 ac-ft (acre-foot). This water volume is a total of 1 pond on the job site. The total amount of this water volume that could be used in a day, depending on weather conditions, is an estimate of 120,000 gallons, or 0.3673094 acre-foot. One acre-foot equals 326,700 gallons.³ From this average, 10,000 gallon size trucks could haul water at least 65 times a day; give or take, depending on the size of the water trucks and the weather conditions.

Secondly, we looked at implementing a cistern system. The normal cistern system is estimated to cost approximately \$12,000.00/each 5000 gallon tank.⁴ With a quote of 500,000 gallon of water per job; one would need at least 100 cistern tanks. Thus, the cost to even establish this option would be \$1,200,000.00 (\$12,000.00 X 100 tanks).

* This estimate does not include the cost of maintaining the cistern system. Maintenance alone is ~\$16,233.00 per year/per cistern.

4. Alternative process or treatment options. Indicate what process or treatment options have been evaluated and provide the reasons they were not considered feasible.

The first alternative treatment option that was explored was Limestone Sand Dosing. Limestone Sand Dosing is when limestone sand is being added to an acidic stream by a dump truck.

The limestone would be distributed downstream by periodic flooding. The sand must be replenished approximately 1 or 2 times per year, depending on flooding frequency. Limestone sand addition is most effective for streams that have low pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream, but probably over a shorter stretch than without treatment.⁵ As stated, the limestone sand is added by dump trucks. Even with the availability of trucks already on site, one isn't guaranteed this option will work. The site must have truck access to stream at all times. All ponds may not have truck access at all points in time, therefore hindering the use of this option. This is not withstanding the cost to do this option. According to a study, the estimated cost of this project is \$200,000⁶ per site. This estimate includes the \$350.00/ton of limestone cost, and the cost of sand. The cost, alone, per small dump truck is ~\$47,500.00, not including maintenance and upkeep. Bringing the cost of this project to \$200,000+ per limestone sand dosing site.

A second option of limestone channeling was also considered. Limestone channel bars are constructed by combining limestone gravel and sand. The limestone gets coated by iron or aluminum hydroxides, but some limestone dissolution still occurs. These methods are most effective for streams that have low pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream. Again, the cost of installation and upkeep would reach well over \$200,000.00 per site (Including limestone and the cost of dump trucks). Other disadvantages of limestone channeling is that:

1. Limestone does not guarantee a safe result.
2. Limestone is easily coated and is then ineffective.
3. Limestone must be replaced regularly.
4. Limestone is unpredictable.⁷

Both options obviously aren't reliable and may impose unsafe conditions, notwithstanding the fact that results on pH, alkalinity and other water tested components are going to fully depend on the limestone actions, therefore being inaccurate.

Alternatives Analysis - continued

5. **On-site or subsurface disposal options.** Discuss the potential for on-site or subsurface disposal. If these options are not feasible, then please indicate the reasons why.

One option would be setting up pump stations to transport wastewater to septic tanks. In most cases, the mining facility is normally located in remote areas away from the urban settlements; therefore, making the disposal of wastewater into public sewers a true challenge. Even if the mining industry is located nearby a public sewer, it may not be allowed to discharge the wastewater into public sewers as the quantity and quality of mine wastewater can create considerable imbalance in the operation of municipal wastewater treatment plants. As stated above, to effectively transport the discharge to this facility it would require multiple lift and pump stations, (which are approximately \$200,000.00 each, and it cost approximately \$ 393,792 per year, per pump to maintain them)⁸ With piping cost, estimated at \$22/foot, alone piping for a 5 mile radius would cost over \$580,000.00. (5 miles X 5280 ft/mile = \$26,400.00. \$26,400.00 X \$22/foot = \$580,800.00). Too, after the job is finished, there would be no sewage users, thus the septic system would have to be removed. At paying men ~\$25.00 per hour to remove lines, haul garbage, etc, the removal would cost, alone, more than \$30,000.00. (4 men working at 4 weeks = 640 hours. 640 hours X \$25.00/hour = \$16,000.00. \$16,000.00 + the cost to remove and dispose of the system = \$20,000.00+)

Septic tanks are estimated to cost as low as \$1,500.00 to over \$8,000.00. "An average installation cost of \$4,000.00 is assumed for a traditional septic tank/soil absorption system in a geological favorable area."⁹ Every home that is not hooked to a sewer system is required to have a septic tank system. So if a permit has a hundred acres, then that will require multiple septic tank systems.

Aquifer Storage and Recovery (ASR) wells were also considered for potential however it could possibly introduce sediment and contaminants into the aquifer with the water not being settled out by flowing through sediment ponds. It is common that Within 1 mile of the injection site homeowners with existing wells would not be able to use their wells for drinking. Also, homeowners would not be able to drill new potable water wells. It is not yet fully understood how ASR wells can create ground water changes resulting in major physical, chemical, and biological impacts to aquatic ecosystems and species. The potential environmental and economic impact alone makes this option unfeasible. Cost per well is estimated at \$300,000.

6. **Evaluation of any other alternatives to lowering water quality.** Describe any other alternatives that were evaluated and provide the reasons why these alternatives were not feasible.

Choosing not to mine this area as a means of lowering water quality was evaluated, but due to the loss of jobs, loss of other indirect jobs, and loss of revenues relating to this operation would have a negative economic effect. An estimated 90 jobs will be lost in this area if it's not chosen to be mined. Also, Knox County will lose \$426,449.21 in severance tax money.

Because surface mining techniques must be used to maximize the recovery of coal reserves, on site water treatment were considered. Sediment ponds will be used to retain the water for an acceptable amount of time to allow the solids to settle effectively. Silt fences and straw bales can be used in lower elevations where run-off may not flow to a pond. However these fences would not be stable in the steeper areas where strong flows could / would possibly sweep them away.

Another alternative would be to accept more stringent water limits. This would cause the iron requirement to go from 1.0 to 0.5. To maintain these limits, one would have to continually add soda ash and lime. According to a test run in AMDtreat4.0 (this program can be obtained and downloaded at <http://amd.osmre.gov/GettingStarted.htm#Reverse>) to maintain these limits would cost approximately \$23,512.00 more than the current costs. Withstanding the fact that the lowering of limits wants to be avoided, the cost is quite steep per change.

III. Socioeconomic Demonstration

1. State the positive and beneficial effects of this facility on the existing environment or a public health problem.

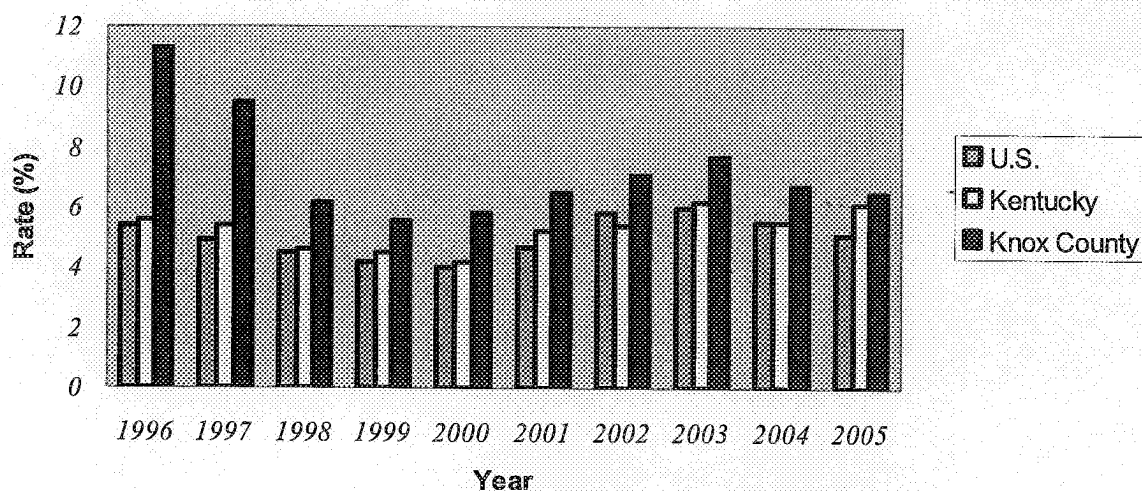
rior underground mining and surface mining occurred in this area, thus negatively affecting some of the watersheds. However, the area will benefit because once mitigation begins, the stream banks will be stabilized to prevent erosion. Also, species indigenous to the area will be planted and help establish an adequate riparian zone; Stream channels will be rehabilitated to curb sedimentation. This will provide a healthier habitat for aquatic species and wildlife leading to a well balanced ecosystem. State and federal regulations are being followed so that no problems occur.

2. Describe this facility's effect on the employment of the area

Employment in each community will be directly and indirectly impacted with new employment. The communities in Knox have unemployment rates that are quite higher than the state and national averages. (See Chart below) This specific project is expected to employ approximately 90 individuals who will aide in lowering the unemployment rate, in areas that lacks employment and business opportunities.

Each unemployed person who becomes employed in Knox County is estimated to make an income of \$18,000.00 annually.¹⁰

Unemployment Rates 1996-2005



3. Describe how this facility will increase or avoid the decrease of area employment.

Knox County is heavily dependant on the coal industry for employment and funding.

According to www.coaleducation.org, Knox County miners make up 0.6% of the total employed people in the county. The employees of Punch Hollow make up 68% of this total number. (The total number of mining employees in Knox County = 66. Approximate total at Punch Hollow = 45).

Therefore, the ongoing work of this job will help maintain the employment number, and aid in raising it.

If the jobs were taken away, there would be a detrimental effect on people, causing a drastic rise in unemployment rates. The jobs continued by this project will assure that these employees won't become a part of that number.

4. Describe the industrial or commercial benefits to the community, including the creation of jobs, the raising of additional revenues, the creation of new or additional tax bases.

In addition to direct jobs provided by this project, it will also provide indirect employment opportunities, including equipment sales, engineering services, food services, fuel sales, transportation, and other services.

During the fiscal year 2004-2005, alone, Knox County generated \$842,074.00¹² in coal severance tax money, of which \$577,646.00 is slated to be returned back to the county. (Punch Hollow is estimated to contribute 53.% of this number= \$426,449.21 in severance tax.) This money is used for local education, health services, and infrastructure projects. The addition of this job will contribute to this tax base.

5. Describe any other economic or social benefits to the community.

As stated above, with the additional contribution of taxes that each county will receive from the coal severance taxes, public roads, buildings, and other infrastructures will benefit from this job.

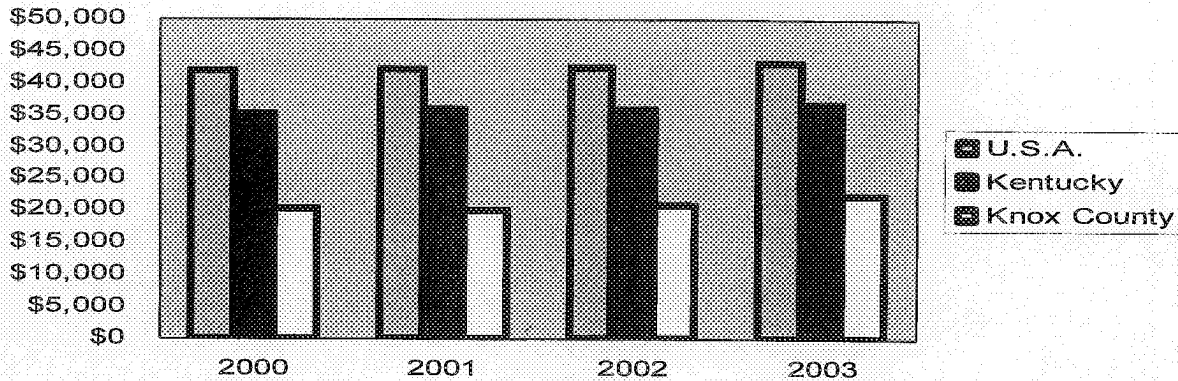
Also, the work on the haul road will benefit the public. This provides better access to the community, and since the coal operators are repairing the roads, the counties monies can be distributed elsewhere.

The jobs that this project provides pay some of the highest wages in Knox County. This will obviously have a positive impact on the each community's economy. The average earnings rate will rise, causing a more desirably, livable environment. The expected salaries for this job site average \$670.34 weekly. weekly

From 2000-2003, data shows that the average Knox County resident earned almost \$15,100.00 per year less than the average Kentucky resident and \$21,600.00 per year less than the average U.S. resident.

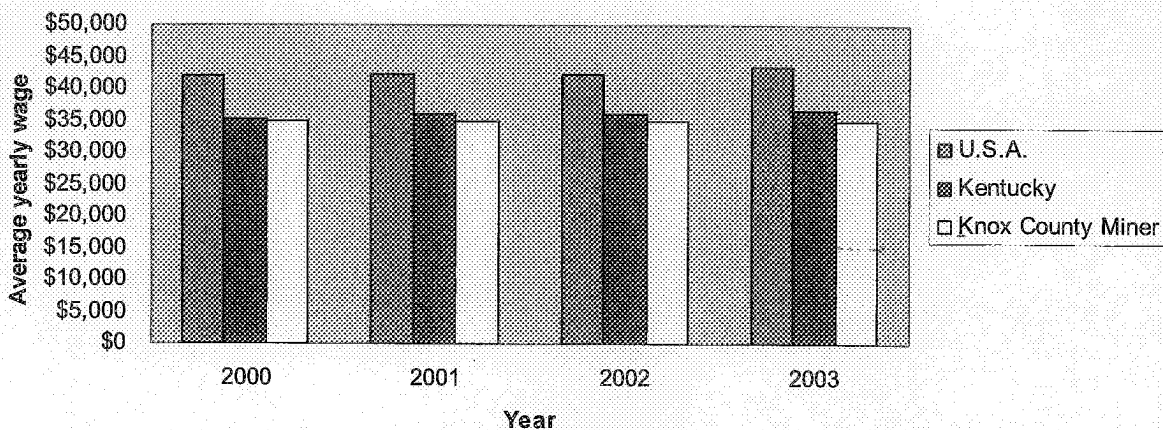
(See chart)¹³

Wage Rate 2000-2003



However, during the same period, the average Knox County miner earned \$1,100.00 per year less than the average Kentuckian, and nearly \$7,700.00 per year less than the average American; which is a major increase in income compared to the average Knox County resident in the chart above. (See Chart below) ¹⁴

Knox County Miner vs. USA/Kentucky



III. Socioeconomic Demonstration - continued

	Yes	No
6. Will this project be likely to change median household income in the county?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Will this project likely change the market value of taxable property in the county?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Will this project increase or decrease revenues in the county?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Will any public buildings be affected by this system?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. How many households will be <i>economically</i> or <i>socially</i> impacted by this project? Total: (~ 270 +) (90 being direct employees, 180 being indirect) Knox County: (~ 135 +) (45 being direct employees, 90 being indirect)		
11. How will those households be <i>economically</i> or <i>socially</i> impacted? (For example, through creation of jobs, educational opportunities, or other social or economic benefits.)		

The average weekly earnings for a mining employee in Knox County in 2004 was \$670.34. These earnings accounted for 1.2%¹⁵ of the total county wages for that time period. Based on this data, these households will earn \$34,857.68 annually.

This influx of monies will allow these households the ability to maintain and/or enhance their economic status and provides opportunities for improved social welfare. Therefore, the household is positively impacted.

12. Does this project replace any other methods of sewage treatment to existing facilities?
(If so describe how)

Yes

☐

No

☒

Residents in the surrounding permit area either use septic tank systems, or other means of waste disposal. There is no other treatment taking place within the project boundary.

13. Does this project treat any existing sources of pollution more effectively?
(If so describe how.)

Yes

☒

No

☐

Sediment control from mining will be improved. There are gas wells in the area, lacking any form of control. This project will improve sediment control for these locations. Prior to the start of this project, the mine site will be cleared and all garbage material will be disposed of. The estimated land run-off is 120.4 acres.

III. Socioeconomic Demonstration - continued

14. Does this project eliminate any other sources of discharge or pollutants?
(If so describe how.)

Yes

☒

No

☐

See Attachment 3.14

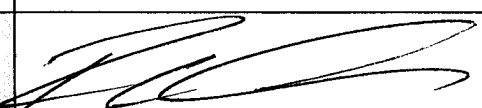
15. How will the increase in production levels positively affect the socioeconomic condition of the area?

See Attachment 3.15

16. How will the increase in operational efficiency positively affect the socioeconomic condition of the area?

See Attachment 3.16

IV. Certification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Title:	Richard Liperote Authorized Agent	Telephone No.:	606 599-8227
Signature:		Date:	6-22-09

ATTACHMENT 3.14

Existing overgrowth by invasive plant species will be removed and channelization of receiving streams due to excessive silting will be improved. Haul roads in the area will be maintained and improved to assure proper water containment. After completion of reclamation, these sources will be fixed. 3657 feet of stream is the estimated stream footage within the permit boundary watershed that will be improved by Hopkins Coal Co.

ATTACHMENT 3.15

This project will remove approximately 350,987 tons of coal :

Blue Gem= $34.6 \times 30'' \times 145 = 120408$ tons

Jellico= $25.9 \times 50'' \times 145 = 187775$ tons

Vanderpool= $24.6 \times 12'' \times 145 = 42804$ tons

$120408 + 187775 + 42804 = 350987$ tons of coal that would not have been recovered or made available to the market otherwise resulting in the direct employment of 90 people in the area. It will also create new employment opportunities, aid in development and maintenance of indirect jobs, and will increase the amount of money the area receives in personal and severance tax.

ATTACHMENT 3.16

The increase in operational efficiency will in turn increase the production levels leading to increased employment opportunities in the area, maintenance of existing employment, development and maintenance of indirect jobs. It will also increase monies and taxes obtained from coal. Through this, recovery of more coal is possible, and this leads to increase in production having a positive effect on the area.

References

¹ Distance estimate was calculated using coordinates on <http://jan.ucc.nau.edu/~cvm/latlongdist.html>

² Estimate derived from:

http://www.pumpingmachinery.com/pump_magazine/pump_articles/article_33/PS%20paper%20November%2010%202004.doc

Pump Operation Costs as a Function of Operating Flow in Wastewater Treatment

Case Study

Dr. Lev Nelik, P.E., APICS

Pumping Machinery, LLC

³ <http://www.grow.arizona.edu/water/waterscience/acrefoot.shtml>

⁴ Kessner, K., 2000: How to Build a Rainwater Catchment Cistern. The March Hare, Summer 2000, Issue 25, (<http://www.dancingrabbit.org/newsletter/>)

⁵ Acid Mine Drainage Treatment Plans

<http://www.facstaff.bucknell.edu/kirby/AMDtrmt.html>

⁶ <http://www.epa.gov/owow/nps/Success319/state/ky.htm#results>

⁷ **Limestone Treatment of Acid Waste**

A white paper by Wastech Controls & Engineering, Inc.,

<http://www.wastechengineering.com/papers/limestone.htm>

⁸ Estimate derived from:

http://www.pumpingmachinery.com/pump_magazine/pump_articles/article_33/PS%20paper%20November%2010%202004.doc

Pump Operation Costs as a Function of Operating Flow in Wastewater Treatment

Case Study

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Pumping Machinery, LLC

⁹ <http://www.epa.gov/owm/mtb/septic.pdf>

¹⁰ <http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=4090>

¹¹ <http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=3722>

¹² **Expanded Online Kentucky Coal Facts,**

http://www.coaleducation.org/Ky_Coal_Facts/Default.htm

¹³ <http://www.workforcekentucky.ky.gov/cgi/dataanalysis/incomeReport.asp?menuchoice=income>

¹⁴ http://www.coaleducation.org/Ky_Coal_Facts/Default.htm

¹⁵ http://www.coaleducation.org/Ky_Coal_Facts/Default.htm

**Kentucky Pollutant Discharge Elimination System (KPDES)
Instructions
KPDES Permit Application Supplemental Information**

SECTION I – PERMITTEE INFORMATION

Facility Name:	Provide the name of the facility
Mailing Address, City, State, and Zip Code:	Provide the mailing address
KPDES No.:	Provide the KPDES permit number for the facility
County:	Indicate the county in which the facility is located
Receiving Water Name:	Indicate the water body into which the facility discharges or plans to discharge.

SECTION II – Alternatives Analysis

For each item, provide a synopsis of the evaluations that were performed. A successful demonstration will provide justifications as to why these alternatives were not consider viable.

Include appropriate supporting documentation.

SECTION III – Socioeconomic Demonstration

Answer yes or no as appropriate. Where indicated, provide a synopsis of the positive economic impacts that will result from this project. A successful demonstration will show why the lowering of water quality is necessary to accommodate important economic or social development in the area.

Include appropriate supporting documentation.

SECTION IV - CERTIFICATION

Name and Title:	Indicate the name and title of the person signing the form.
Telephone No.:	Provide the telephone number of the person signing the form.
Date:	Indicate the date that the form was signed.

This form is part of the permit application and must be signed as follows:

Corporation: by a principal executive officer of at least the level of vice president
Partnership or sole proprietorship: by a general partner or the proprietor respectively